All India Test Series (2023-24)

Test Code: ANY/10

AITS TEST - 10

YAKEEN NEET

DURATION: 200 Minutes | **DATE: 23/04/2024** | **M. MARKS: 720**

ANSWER KEY

(PHYSICS)

SECTION-A

1.	(4)	8.	(4)	15.	(4)	22.	(3)	29.	(2)
2.	(1)	9.	(4)	16.	(1)	23.	(2)	30.	(1)
3.	(4)	10.	(3)	17.	(2)	24.	(3)	31.	(4)
4.	(4)	11.	(2)	18.	(1)	25.	(2)	32.	(1)
5.	(2)	12.	(3)	19.	(4)	26.	(2)	33.	(2)
6.	(4)	13.	(4)	20.	(1)	27.	(3)	34.	(2)
7.	(2)	14.	(4)	21.	(1)	28.	(4)	35.	(4)

SECTION-B

36.	(3)	39.	(4)	42.	(4)	45.	(3)	48.	(4)
37.	(3)	40.	(1)	43.	(1)	46.	(1)	49.	(2)
38.	(1)	41.	(4)	44.	(2)	47.	(4)	50.	(3)

(CHEMISTRY)

SECTION-A

51.	(2)	58.	(4)	65.	(2)	72.	(2)	79.	(1)
52.	(2)	59.	(2)	66.	(3)	73.	(2)	80.	(1)
53.	(2)	60.	(2)	67.	(4)	74.	(3)	81.	(3)
54.	(4)	61.	(3)	68.	(2)	75.	(4)	82.	(2)
55.	(4)	62.	(4)	69.	(4)	76.	(1)	83.	(3)
56.	(1)	63.	(3)	70.	(1)	77.	(3)	84.	(1)
57.	(2)	64.	(1)	71.	(3)	78.	(4)	85.	(4)

SECTION-B

86.	(1)	89.	(4)	92.	(2)	95.	(2)	98.	(1)
87.	(1)	90.	(4)	93.	(3)	96.	(2)	99.	(2)
88.	(1)	91.	(4)	94.	(3)	97.	(4)	100.	(4)

(BOTANY)

SECTION-A

101.	(1)	108.	(4)	115.	(4)	122.	(1)	129.	(2)
102.	(2)	109.	(3)	116.	(2)	123.	(1)	130.	(1)
103.	(3)	110.	(4)	117.	(4)	124.	(2)	131.	(4)
104.	(1)	111.	(4)	118.	(3)	125.	(3)	132.	(2)
105.	(4)	112.	(1)	119.	(2)	126.	(1)	133.	(4)
106.	(1)	113.	(3)	120.	(3)	127.	(3)	134.	(3)
107.	(4)	114.	(1)	121.	(2)	128.	(4)	135.	(1)

SECTION-B

136.	(4)	139.	(4)	142.	(3)	145.	(1)	148.	(2)
137.	(1)	140.	(2)	143.	(4)	146.	(3)	149.	(2)
138.	(2)	141.	(2)	144.	(2)	147.	(4)	150.	(1)

(ZOOLOGY)

SECTION-A

151.	(1)	158.	(2)	165.	(2)	172.	(3)	179.	(1)
152.	(3)	159.	(4)	166.	(4)	173.	(4)	180.	(3)
153.	(1)	160.	(1)	167.	(2)	174.	(1)	181.	(3)
154.	(2)	161.	(2)	168.	(3)	175.	(1)	182.	(4)
155.	(4)	162.	(1)	169.	(1)	176.	(4)	183.	(1)
156.	(2)	163.	(2)	170.	(2)	177.	(3)	184.	(2)
157.	(1)	164.	(4)	171.	(1)	178.	(3)	185.	(3)

SECTION-B

186.	(2)	189.	(3)	192.	(3)	195.	(2)	198.	(3)
187.	(3)	190.	(2)	193.	(3)	196.	(4)	199.	(4)
188.	(1)	191.	(3)	194.	(3)	197.	(2)	200.	(1)

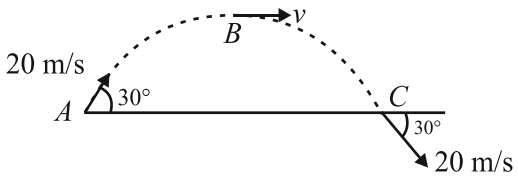
Hints & Solutions

[AITS-10 | Yakeen-NEET | 23-04-2024]

(PHYSICS)

SECTION-A

1. (4)



From *A* to *B*, angle changes from 30° to 0°.
From *B* to *C*, angle changes from 0° to 30°.
Hence during the motion, velocity will never make an angle of 45° with horizontal.

(NEW NCERT 11th Page No. 38)

2. (1)

$$\vec{E}_x = -\frac{dV}{dx}\hat{i}$$

$$\left(\frac{dV}{dx}\right)_{\text{at } x=5} = \frac{-12}{2} = -6$$

$$\vec{E} = -(-6)\hat{i} = 6\hat{i}$$

Positive charge move in the direction of electric field, so it moves away from the origin.

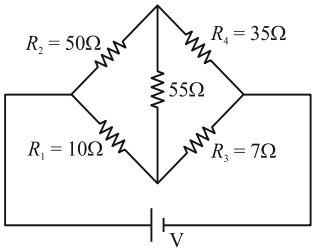
(NEW NCERT 12th Page No. 54, 55)

3. (4)

$$\frac{R_2}{R_1} = \frac{50}{10} = \frac{5}{1}$$

$$\frac{R_4}{R_3} = \frac{35}{7} = \frac{5}{1}$$

$$\frac{R_2}{R_1} = \frac{R_4}{R_3}$$



It is a balanced wheat stone bridge, so no current flows through 55 Ω. Hence, power loss across 55 Ω is zero.

(NEW NCERT 12th Page No. 100, 101)

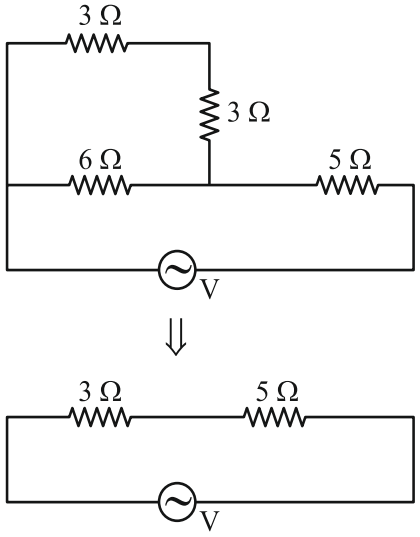
4. (4)

As the block is moving with constant speed, F_{net} on block parallel to plane = 0
also F_{net} on block, perpendicular to plane = 0

(NEW NCERT 11th Page No. 61, 62)

5. (2)

$X_C = \frac{1}{\omega C}$, As ω is very high, So $X_C \approx 0$



Effective impendence of circuit = 5 + 3 = 8 Ω

(NEW NCERT 12th Page No. 186, 187)

6. (4)

v_i = slope of $y - t$ graph at $t = 0$

$= \frac{30}{2} = 15$ m/s

v_f = slope of $y - t$ graph at $t = 3$s $= 0$ m/s

$$a_{avg} = \frac{v_f - v_i}{t} = \frac{0-15}{3} = -5 \text{ m/s}^2$$

(NEW NCERT 11th Page No. 16, 17)

7. (2)

$q_{\text{enclosed}} = 8 - 5 = 3\ \mu\text{C} = 3 \times 10^{-6}$ C
Net number of electric field line passing
$= 3 \times 10^{-6} \times 10^{10} = 3 \times 10^4$

(NEW NCERT 12th Page No. 29, 30)

8. (4)

$\Delta f = 526 - 512 = 14$ Hz
As $\Delta f > 10$ Hz, so human ears cannot hear the beats.

(NEW NCERT 11th Page No. 293, 294)

9. (4)

$$E = -\frac{13.6Z^2}{n^2}$$

for Beryllium, $Z = 4$

$$E_1 = \frac{-13.6 \times (4)^2}{1^2} = -217.6 \text{ eV}$$

(NEW NCERT 12th Page No. 298)

10. (3)

$$\frac{x^2}{A^2}+\frac{v^2}{(A\omega)^2}=1$$

$\omega = 1$ rad/s

$$\frac{x^2}{A^2}+\frac{v^2}{A^2}=1$$

$x^2 + v^2 = A^2$

This represent equation of circle.

(NEW NCERT 11th Page No. 266, 267)

11. (2)

As there is no external force acting, acceleration of centre of mass = 0

Hence, V_{COM} = constant

Final velocity of COM = Initial velocity of COM

Final velocity of COM = 0

(NEW NCERT 11th Page No. 99)

12. (3)

As magnet moves towards right, magnetic flux linked to loop *B* will increase and for loop *A*, it will decrease, hence induced current will be in opposite direction for loop *A* and *B*.

(NEW NCERT 12th Page No. 156, 157)

13. (4)

Apply conservation of energy,

$$\frac{-GMm}{3R}+0=\frac{-GMm}{2R}+\text{K. E}$$

$$\text{K. E} = \frac{-GMm}{3R}+\frac{GMm}{2R}$$

$$= \frac{1}{6}\frac{GMm}{R} = \frac{1}{6}\text{mgR}$$

(NEW NCERT 11th Page No. 134, 135)

14. (4)

Magnetic field lines inside the bar magnet are from south to north and outside the bar magnet are from north to south.

(NEW NCERT 12th Page No. 137)

15. (4)

For OR gate, Y = A + B

A = 0, B = 0 $\Rightarrow$ Y = 0 + 0 = 0

A = 0, B = 1 $\Rightarrow$ Y = 0 + 1 = 1

A = 1, B = 0 $\Rightarrow$ Y = 1 + 0 = 1

A = 1, B = 1 $\Rightarrow$ Y = 1 + 1 = 1

(OLD NCERT 12th Page No. 491, 492)

16. (1)

Apparent depth of vessel

$$=\frac{H}{\mu_1}+\frac{H}{\mu_2}$$

(NEW NCERT 12th Page No. 228, 229)

17. (2)

$$\theta=\omega_i t+\frac{1}{2}\alpha t^2$$

$$200\pi=\frac{1}{2}\alpha(8)^2$$

$$\frac{400\pi}{64}=\alpha,\quad \alpha=6.25\pi$$

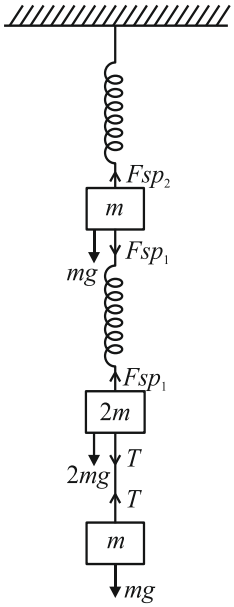
$$\omega_f=\omega_i+\alpha t=0+6.25\pi\times 8$$

$= 50\ \pi$ rad/s

$= 3000\ \pi$ rad/min

(NEW NCERT 11th Page No. 105)

18. (1)



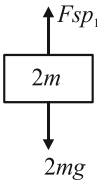
At equilibrium

$$F_{sp_1}=2mg+T$$

= 2 mg + mg

= 3 mg

When string is cut,



$$F_{sp_1}-2mg=2ma_B$$

$$a_B=\frac{3mg-2mg}{2m}=\frac{g}{2}\ \text{(upwards)}$$

(NEW NCERT 11th Page No. 53, 54)

19. (4)

Direction of propagation of EM wave is along vector = $\vec{E}\times\vec{B}$

$$-\hat{j}=\hat{E}\times\hat{i}$$

$$\hat{E}=-\hat{k}$$

(NEW NCERT 12th Page No. 206)

20. **(1)**

$$P = \frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

focal length depend on R_1 and R_2.

R_1 and R_2 remains unchanged when cut along principal axis.

When biconvex lens is cut perpendicular to principal axis, radius of curvature becomes infinity on the surface which is cut.

(NEW NCERT 12th Page No. 235)

21. **(1)**

$$d = \frac{a^{\frac{3}{2}} b^{\frac{1}{4}}}{c}$$

$$\frac{\Delta d}{d} \times 100 = \frac{3}{2}\left(\frac{\Delta a}{a} \times 100\right) + \frac{1}{4}\left(\frac{\Delta b}{b} \times 100\right) + \left(\frac{\Delta c}{c} \times 100\right)$$

$$= \left(\frac{3}{2} \times 2\right) + \frac{1}{4}(4) + 2$$

= 3 + 1 + 2 = 6%

(OLD NCERT 11th Page No. 26)

22. **(3)**

$$F = -\frac{d}{dx}(U_x)$$

$$= -\frac{d}{dx}(x^3 + 2x + 3)$$

$$= -(3x^2 + 2)$$

(NEW NCERT 11th Page No. 78)

23. **(2)**

$V_d = \mu E$ (μ mobility of electron)

$$E = \frac{V}{L}$$

$$V_d = \frac{\mu V}{L}$$

As μ, V, L are constant, hence V_d does not depend on area of cross section.

(NEW NCERT 12th Page No. 84, 85)

24. **(3)**

Voltage V is leading to current I by θ, (where $\theta < 90°$), so it is the condition for $L - R$ series circuit.

(NEW NCERT 12th Page No. 183)

25. **(2)**

$$\left(\frac{T - F.P}{B.P - F.P}\right)_{true} = \left(\frac{t - F.P}{B.P - F.P}\right)_{faulty}$$

$$\left(\frac{T - 0}{100 - 0}\right) = \frac{40 - (-1)}{104 + 1}$$

$$\frac{T}{100} = \frac{41}{105}$$

$T \approx 39°C$

(NEW NCERT 11th Page No. 203)

26. **(2)**

$$P = \frac{n}{t} \times \left(\frac{hc}{\lambda}\right); 62 = \left(\frac{n}{t}\right) \times \frac{12400}{4800} \times 1.6 \times 10^{-19}$$

$$\frac{n}{t} = 1.5 \times 10^{20}$$

(NEW NCERT 12th Page No. 283)

27. **(3)**

$$\frac{U_1}{U_3} = \frac{\frac{1}{2}k_1 x_1^2}{\frac{1}{2}k_3 x_3^2}$$

$$\frac{10}{U_3} = \frac{3}{1} \qquad (x_1 = x_3 = x)$$

$$U_3 = \frac{10}{3} \text{ J}$$

(NEW NCERT 11th Page No. 80)

28. **(4)**

$$\frac{\lambda_p}{\lambda_e} = \frac{\frac{h}{m_p v_p}}{\frac{h}{m_e v_e}} = \frac{m_e v_e}{m_p v_p}$$

$$1.81 \times 10^{-4} = \frac{9.1 \times 10^{-31}}{m_p} \times \frac{1}{3}$$

$m_p = 1.675 \times 10^{-27}$ kg

(NEW NCERT 12th Page No. 285)

29. **(2)**

Frequency remains unchanged

So, $\frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$

$$\frac{v}{\lambda} = \frac{v}{3\lambda_2}$$

$$\lambda_2 = \frac{\lambda}{3}$$

(NEW NCERT 11th Page No. 284)

30. **(1)**

Both D_1 and D_1 are reverse biased.

$R_{eq} = 2 + 8 = 10\ \Omega$

$V = iR_{eq}$

$10 = 10i$, $i = 1$ A

(NEW NCERT 12th Page No. 334)

31. **(4)**

$K_{eff} = k + 2\,k = 3k$

$T = 2\pi\sqrt{\frac{m}{k_{eff}}} = 2\pi\sqrt{\frac{2m}{3k}}$

(NEW NCERT 11th Page No. 268)

32. **(1)**

$\vec{F}_m = i(\vec{\ell}\times\vec{B})$

As $\oint\vec{d\ell} = 0$

so, $|F_m| = 0$

(NEW NCERT 12th Page No. 110)

33. **(2)**

From graph, $\frac{V}{T} = \text{Slope} = \frac{nR}{P}$

Slope = $\frac{nR}{P} = \tan 37° = \frac{3}{4}$

$\frac{3\times 8.3}{P} = \frac{3}{4}$

P = 33.2 pascal

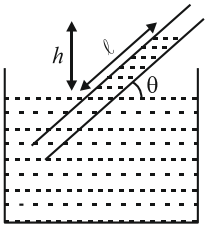
(NEW NCERT 11th Page No. 233, 234)

34. **(2)**

In YDSE, all bright and dark fringes are of equal width.

(NEW NCERT 12th Page No. 264, 265)

35. **(4)**



Vertical height of water column remains the same.

$l \sin\theta = h$

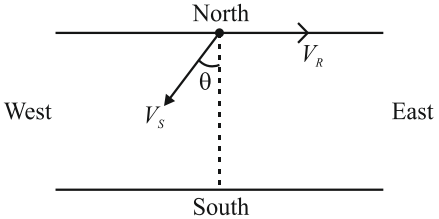
$l \sin 37° = 9$

$l = \frac{9}{\frac{3}{5}} = 15\,\text{cm}$

(NEW NCERT 11th Page No. 196, 197)

SECTION-B

36. **(3)**

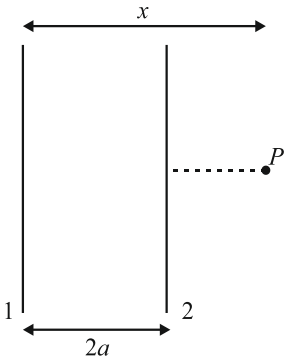


$V_S \sin\theta = V_R$

$20\sin\theta = 10$, θ = 30° (West of South)

(NEW NCERT 11th Page No. 36, 37)

37. **(3)**



$E_p = E_1 - E_2 = 0$

$E_1 = E_2$

$\frac{2k\lambda_1}{x} = \frac{2k\lambda_2}{x-2a}$

$\lambda_1(x-2a) = x\lambda_2$

$\lambda_1 x - 2\lambda_1 a = x\lambda_2$

$(\lambda_1 - \lambda_2)x = 2\lambda_1 a$

$x = \frac{2\lambda_1 a}{\lambda_1 - \lambda_2}$

(NEW NCERT 12th Page No. 33)

38. **(1)**

P.D across $2\,\mu F = \frac{24}{2} = 12$ volt

P.D across $6\,\mu F = 18 - 12 = 6$ volt

Charge on $6\,\mu F = 6\times 6 = 36\,\mu F$

Charge on C = 36 – 24 = 12 μC

$C = \frac{Q}{V} = \frac{12}{12} = 1\,\mu F$

(NEW NCERT 12th Page No. 70, 71)

39. **(4)**

$\frac{F}{A} = Y \times \frac{\Delta\ell}{\ell}$

$F = \left(\frac{YA}{\ell}\right)\Delta\ell$

$F = k\Delta\ell$

$10 = k\,(x - \ell)$ …(1)

$12 = k\,(y - \ell)$ …(2)

$\frac{6}{5} = \frac{y-\ell}{x-\ell}$

$\ell = 6x - 5y$

(NEW NCERT 11th Page No. 170, 171)

40. **(1)**

When we move from A to B, the area under the graph is continuously increasing, so work done by gas is also continuously increasing.

(NEW NCERT 11th Page No. 229, 230)

41. (4)

$_1^2H + _1^2H \rightarrow _2^4He + E$

$(B.E)_{reactant}$ = 2 (1.1 + 1.1) = 4.4 MeV

$(B.E)_{product}$ = 4 × 7 = 28 MeV

E = 28 – 4.4 = 23. 6 MeV

(NEW NCERT 12th Page No. 331, 332)

42. (4)

Magnetic permeability of paramagnetic material is slightly more than that of vacuum (μ_0), hence the density of lines is slightly higher inside paramagnetic material.

(NEW NCERT 12th Page No. 146, 147)

43. (1)

$\beta = \frac{\lambda D}{d}$, $\beta \propto \lambda$

$\lambda_r > \lambda_g$, so fringes become broader.

(NEW NCERT 12th Page No. 264, 265)

44. (2)

Loss in kinetic energy = gain in internal energy

$$\frac{1}{2}mV^2 = \frac{5}{2}nR(\Delta T)$$

$$(m)\frac{40000}{2} = \left(\frac{5}{2}\right)\left(\frac{m}{M}\right)R(\Delta T)$$

$$8000 = \frac{1}{40\times10^{-3}} \times R \times (\Delta T)$$

$$\Rightarrow \Delta T = \frac{320}{R}\,^\circ\text{C}$$

(NEW NCERT 11th Page No. 252, 253)

45. (3)

Using continuity equation,

$Q_1 = Q_2 + Q_3 + Q_4$

$25 = 5 + 10 + Q_4$

Q_4 = 10 m^3/s

A_4V_4 = 10

$0.5V_4$ = 10, V_4 = 20 m/s

(NEW NCERT 11th Page No. 187)

46. (1)

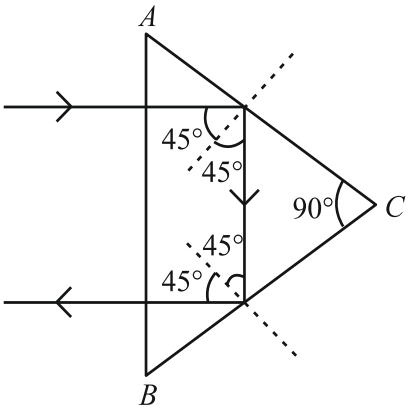
$$e = \frac{1}{2}B\omega\ell^2$$

$$\omega = 50\,\text{rev/s} = (50\times2\pi)\,\text{rad/s}$$

$$e = \frac{1}{2}\times(6.28\times10^{-3})(50\times2\pi)\times1^2 = 1\text{ volt}$$

(NEW NCERT 12th Page No. 163)

47. (4)



As 45° > Critical angle, ray suffer TIR at surface AC and BC.

(NEW NCERT 12th Page No. 238, 239)

48. (4)

$\vec{F} = q(\vec{V} \times \vec{B})$

As charge is initially at rest, V = 0

So, F = 0 N, therefore charge will remains at rest.

(NEW NCERT 12th Page No. 111)

49. (2)

$$MOI = \frac{Mb^2}{12}$$

$$\frac{Mb^2}{12} = MR^3$$

$$R^3 = \frac{b^2}{12},\ R = \frac{b^{\frac{2}{3}}}{(12)^{\frac{1}{3}}}$$

(NEW NCERT 11th Page No. 114, 115)

50. (3)

To escape from earth surface, total energy = 0

Near earth surface, $V_0 \approx$ 8 km/s

$V_e \approx$ 11.2 km/s

Minimum additional velocity = 11.2 – 8 = 3.20 km/s

(NEW NCERT 11th Page No. 137 ,138)

(CHEMISTRY)

SECTION-A

51. (2)

Weight of metal oxide = 8.0 g

Weight of vanadium = 6.08 g

% of V in metal oxide = $\frac{6.08}{8.0} \times 100 = 76$

Thus, % of O in metal oxide = 100 – 76 = 24

Number of moles of V = $\frac{76}{52} = 1.46$

Number of moles of O = $\frac{24}{16} = 1.5$

Simplest ratio of V and O = 1 : 1

Hence, the empirical formula is VO

(NEW NCERT 11th Part-I Page No. 19)

52. (2)

Wavelength (λ) of absorption is inversely proportional to CFSE (Δ_0 value) of complex.

Since Δ_0 for SCN^- is minimum, due to which $[Co(SCN)_6]^{3-}$ has maximum value of λ of absorption.

(NEW NCERT 12th Part-I Page No. 133)

53. (2)

30 g/dm^3 of urea is isotonic with 20% solution of a non-volatile solute.

Molar concentration of urea- solution

$= \frac{30}{\text{Molecular weight of urea}}$

$= \frac{30}{60}M = \frac{1}{2}M$

Molar concentration of 20% non-volatile solute

$= \frac{20}{\text{Molecular weight of non-volatile solute}}$

$= \frac{20}{x}M$

(x = molecular weight of non-volatile solute)

Both solutions are isotonic to each other, therefore

$\frac{1}{2} = \frac{20}{x}$

$x = 20 \times 2 = 40 \text{ g mol}^{-1}$

(NEW NCERT 12th Part-I Page No. 22)

54. (4)

Hell-Volhard Zelinsky reaction;

I. $CH_3—CH_2—COOH \xrightarrow[(ii)\ H_2O]{(i)\ Cl_2/Red\ P} CH_3—\underset{Cl}{CH}—COOH$

II. $CH_3-CH_2-COOH \xrightarrow{PCl_3} CH_3-CH_2-COCl$

(NEW NCERT 12th Part-II Page No. 253)

55. (4)

Kjeldahl's method is used for the estimation of nitrogen.

(NEW NCERT 11th Part-II Page No. 287)

56. (1)

- In $[Mn(H_2O)_6]^{2+}$;

  Mn^{2+} has $3d^5$ configuration: $t_{2g}^3 e_g^2$

  CFSE = [–0.4×3] + [0.6×2] = 0
- In $[Fe(CN)_6]^{4-}$;

  Fe^{2+} has $3d^6$ configuration: $t_{2g}^6 e_g^0$

  CFSE = [–0.4×6] + [0.6×0] = $-2.4\Delta_0$
- In $[Cr(H_2O)_6]^{3+}$;

  Cr^{3+} has $3d^3$ configuration: $t_{2g}^3 e_g^0$

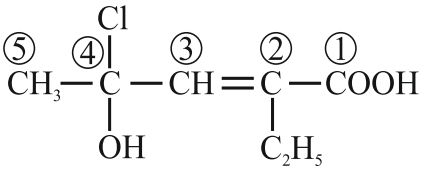
  CFSE = [–0.4×3] + [0.6×0] = $-1.2\Delta_0$
- In $[Co(H_2O)_6]^{3+}$;

  Co^{3+} has $3d^6$ configuration: $t_{2g}^6 e_g^0$

  CFSE = [–0.4×6] + [0×0.6] = $-2.4\Delta_0$

(NEW NCERT 12th Part-I Page No. 132)

57. (2)



Priority of –COOH is more than –OH group. Hence, the correct IUPAC name will be;

4-Chloro-2-ethyl-4-hydroxypent-2-en-1-oic aicd

(NEW NCERT 11th Part-II Page No. 262)

58. (4)

I. Al < Mg < Si (First ionisation enthalpy)

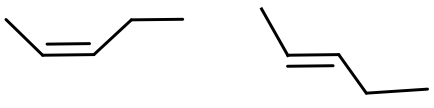
II. Si < P < C (Electronegativity)

III. Cl > F > Br (Negative electron gain enthalpy)

(NEW NCERT 11th Part-I Page No. 87)

59. (2)

Pent-2-ene shows cis-trans isomerism.



cis-pent-2-ene trans-pent-2-ene

(NEW NCERT 11th Part-II Page No. 308)

60. (2)

I. Electrophile can be either neutral or positively charged species and can form a bond by accepting a pair of electrons from a nucleophile.

II. In acetamide, carbonyl C-atom bears partial positive charges, therefore they undergo nucleophilic attack by OH^- ions.

III. Generation of electrophile in Riemer-Tiemann reaction is as follows:

$$CHCl_3 + OH^- \rightleftharpoons {}^-CCl_3 + H_2O$$

$${}^-CCl_3 \longrightarrow :CCl_2 + Cl^-$$

IV. 3-Methyl hexane contains chiral carbon atom. Due to which it exhibits chirality.

(NEW NCERT 12th Part-II Page No. 231)

61. (3)

It is an iodoform reaction which is used to detect CH_3CO group and $CH_3CH(OH)$ group. In option (3), there is neither CH_3CO group nor $CH_3CH(OH)$ group is present, due to which it does not give yellow precipitate on heating with iodine in the presence of sodium hydroxide.

(NEW NCERT 12th Part-II Page No. 271)

62. (4)

$$\Delta T_f = i \times k_f . m$$

$$i = \frac{\Delta T_f \times W_{solvent}}{k_f \times n_{solute} \times 1000}$$

$$= \frac{3.72 \times 500}{1.86 \times \left(\frac{71}{142}\right) \times 1000} = 2$$

(NEW NCERT 12th Part-I Page No. 18)

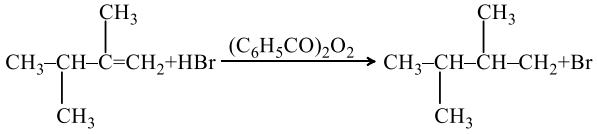
63. (3)

Ca^{2+} has a smaller ionic radius than K^+ because it has higher effective nuclear charge due to greater p/e ratio.

(NEW NCERT 11th Part-I Page No. 87)

64. (1)

Anti-Markovnikov's addition takes place in presence of peroxide.



(NEW NCERT 11th Part-II Page No. 312)

65. (2)

From Faraday's first law of electrolysis,

$$\frac{W}{E} = \frac{I \times t}{96500}$$

Given, I = 10 Ampere and t = 193 sec

$$\frac{W}{E} = \frac{10 \times 193}{96500}$$

$$\frac{W}{E} = 0.02 \text{ = Number of mole of electrons}$$

Number of electrons

$$= 0.02 \times 6.022 \times 10^{23} = 1.20 \times 10^{22}$$

(NEW NCERT 12th Part-I Page No. 51)

66. (3)

Alkanes which contains all equivalent hydrogen atoms forms only one monochloro derivative on halogenation. 2,2,3,3-Tetramethyl butane contains all equivalent hydrogen atoms. So, it will give only one monochloro derivative on halogenation.

(NEW NCERT 11th Part-II Page No. 302)

67. (4)

For first order reaction, $A \rightarrow B$

Rate = $k \times [A]$

Rate = 6.0×10^{-4} mol $L^{-1}s^{-1}$

[A] = 0.02 M

So, $6.0 \times 10^{-4} = k \times 0.02$

$$k = \frac{6.0 \times 10^{-4}}{0.02} s^{-1} = 0.03\ s^{-1}$$

For first order reaction,

$$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{0.03} = 23.1 \text{ sec}$$

(NEW NCERT 12th Part-I Page No. 72)

68. (2)

MnO_2 : +4

$KMnO_4$: +7

K_2MnO_4 : +6

MnO : +2

The oxidation state of Mn is highest in $KMnO_4$.

(NEW NCERT 11th Part-II Page No. 239)

69. (4)

(1) ICl_4^- is square planar in shape.

(2) NO_3^- and CO_3^{2-} are isoelectronic and isostructural.

(3) O_2^- is paramagnetic.

(4) CN^- and NO^+ have same bond order of 3.

(NEW NCERT 11th Part-I Page No. 109)

70. (1)

Ionization energy = – (energy of 1st orbit)

Energy of 1st orbit of $He^+ = -13.6 \times Z^2$

$= -13.6 \times 4$

$= -54.4$ eV

So, Ionization energy of $He^+ = -(-54.4) = 54.4$ eV

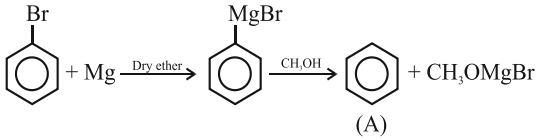
(NEW NCERT 11th Part-I Page No. 48)

71. (3)

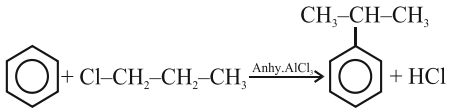
RNA contains adenine, guanine, cytosine and uracil as bases.

(NEW NCERT 12th Part-I Page No. 287)

72. (2)



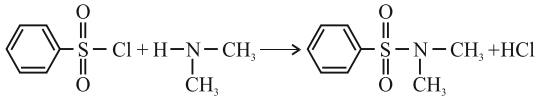
(A)



(B)

(NEW NCERT 12th Part-II Page No. 180)

73. (2)



Since N,N-dimethylbenzene sulphonamide does not contain any hydrogen atom attached to nitrogen atom, it is not acidic and hence insoluble in alkali.

(NEW NCERT 12th Part-II Page No. 271)

74. (3)

$\Delta H = \Delta E + \Delta n_g RT$

$\Rightarrow 63.9 = \Delta E + \frac{1 \times 8.314 \times 298}{1000}$

$\Rightarrow \Delta E = 61.42$ kJ

(NEW NCERT 11th Part-I Page No. 145)

75. (4)

(1) $XeO_3 \rightarrow$

(2) $SeCl_4 \longrightarrow$

(3) $I_3^+ \longrightarrow$

(4) $XeF_2 \longrightarrow$

(NEW NCERT 11th Part-I Page No. 112)

76. (1)

$$Q_c = \frac{\left(\frac{4}{3}\right)^3}{\left(\frac{8}{3}\right)\left(\frac{3}{3}\right)^2} = 0.88$$

Since, $Q_c > K_c$

So, reaction will proceed in backward direction.

(NEW NCERT 11th Part-I Page No. 183)

77. (3)

$$\frac{1}{\lambda} = RZ^2\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right] = R \times 2^2\left[\frac{1}{4^2} - \frac{1}{\infty^2}\right]$$

$$\Rightarrow \lambda = \frac{4}{R}$$

(NEW NCERT 11th Part-I Page No. 45)

78. (4)

List I		List II	
(A)	Glycine	(II)	Optically inactive amino acid
(B)	Serine	(III)	Alcohol containing amino acid
(C)	Histidine	(IV)	Imidazole ring containing amino acid
(D)	Cysteine	(I)	Sulphur containing amino acid

(NEW NCERT 12th Part-II Page No. 290)

79. (1)

The stability of $Cu^{2+}(aq.)$ is more than $Cu^+(aq.)$ is due to the much more negative $\Delta_{hyd}H°$ of Cu^{2+} than Cu^+, which is more than the compensation of the second ionization enthalpy of Cu.

(NEW NCERT 12th Part-I Page No. 100)

80. (1)

According to Le Chatelier's principle, if pressure is decreased, reaction will move to that direction where number of gaseous moles are increasing.

(NEW NCERT 11th Part-I Page No. 185)

81. (3)

- In the solid state, PCl_5 exists as $[PCl_4]^+[PCl_6]^-$ in which the cation, $[PCl_4]^+$ is tetrahedral and the anion $[PCl_6]^-$ is octahedral.
- Orthophosphorous acid (or phosphorous acid) on heating disproportionates to give orthophosphoric acid (or phosphoric acid) and phosphine.

  $4H_3PO_3 \rightarrow 3H_3PO_4 + PH_3$

(OLD NCERT 12th Part-I Page No. 178)

82. (2)

Al_2O_3 ionises as,

$$Al_2O_3 \rightleftharpoons 2Al^{3+} + 3O^{2-}$$

At cathode

$$Al^{3+} + 3e^- \longrightarrow Al$$

Mass of aluminium deposited by 3F of electricity = 27 g

$\therefore$ Mass of aluminium deposited by 2.0×10^5 ampere current for 386 seconds

$$= \frac{27 \times 2.0 \times 10^5 \times 386}{3F} g$$

$$= \frac{27 \times 2.0 \times 10^5 \times 386}{3 \times 96500} g$$

$= 7.2 \times 10^3$ g

(NEW NCERT 12th Part-I Page No. 51)

83. (3)

Solubility of $AB = \sqrt{K_{sp}} = 4 \times 10^{-10}$

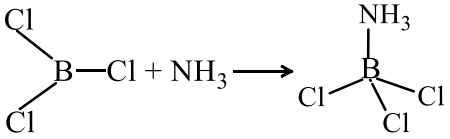
Solubility of $A_2B = \left[\frac{K_{sp}}{4}\right]^{\frac{1}{3}} = 3 \times 10^{-3}$

Solubility of $AB_3 = \left[\frac{K_{sp}}{27}\right]^{\frac{1}{4}} = 1 \times 10^{-4}$

(NEW NCERT 11th Part-I Page No. 204)

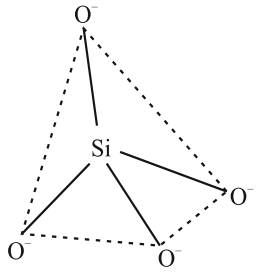
84. (1)

BCl_3 easily accepts a lone pair of electrons from ammonia to form $BCl_3.NH_3$.



Planar Tetrahedral

The basic structural unit of silicates is SiO_4^{4-} in which silicon atom is bonded to four oxygen atoms in tetrahedron fashion.



(OLD NCERT 11th Part-I Page No. 311)

85. (4)

Heat capacity is an extensive property.

(NEW NCERT 11th Part-I Page No. 144)

SECTION-B

86. (1)

$$2Fe(NO_3)_3 + 3Na_2CO_3 \rightarrow Fe_2(CO_3)_2 + 6NaNO_3$$

Limiting reagent is Na_2CO_3, so maximum moles of $NaNO_3$ formed should be = 6 × 2 = 12

$$\% \text{ yield} = \frac{4}{12} \times 100 = 33.3\%$$

(NEW NCERT 11th Part-I Page No. 20)

87. (1)

The balanced redox reaction is:

$$Cr_2O_7^{2-} + 3SO_2 + 2H^+ \rightarrow 2Cr^{3+} + 3SO_4^{2-} + H_2O$$

oxidation state of chromium in the final product = +3

oxidation state of sulphur in the final products = +6

(NEW NCERT 11th Part-II Page No. 293)

88. (1)

A solution of acetone and ethanol shows positive deviation from Raoult's law due to weakening of interactions as addition of acetone break some of H–bond in ethanol.

(NEW NCERT 12th Part-I Page No. 13)

89. (4)

The species formed after adding a proton to the base is known as conjugate acid of the base and the species formed after losing a proton is known as conjugate base of acid. So,

$$NH_2^- + H^+ \rightarrow NH_3$$

(NEW NCERT 11th Part-I Page No. 191)

90. (4)

For $n = 3, l = 2$ and $m = -2$, there can be two electrons with opposite spins.

(NEW NCERT 11th Part-I Page No. 47)

91. (4)

- Carbon in diamond is sp^3 hybridised.
- In the presence of water, chlorine with sulphur dioxide forms sulphuric acid.
  $SO_2 + 2H_2O + Cl_2 \rightarrow H_2SO_4 + 2HCl$

(OLD NCERT 12th Part-I Page No. 198)

92. (2)

$$w = -nRT \ln \frac{P_1}{P_2}$$

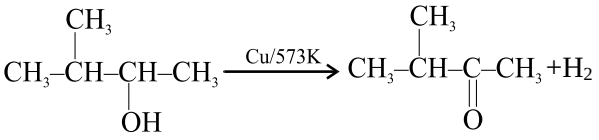
$$= -1 \times 8.314 \times 400 \ln \frac{20}{2}$$

$$= -1 \times 8.314 \times 400 \times 2.303 \times \log \frac{20}{2}$$

$= -7658.8$ J $= -7.65$ kJ

(NEW NCERT 11th Part-I Page No. 140)

93. (3)



(NEW NCERT 12th Part-II Page No. 210)

94. (3)

The order of basic strength for ethyl substituted amines in aqueous solution is as follows:

$(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

(NEW NCERT 12th Part-II Page No. 268)

95. (2)

When aldol condensation is carried out between two different aldehydes or ketones, it is called cross aldol condensation. If both of them contain α-hydrogen atoms, it gives a mixture of four products. Product obtained will be:

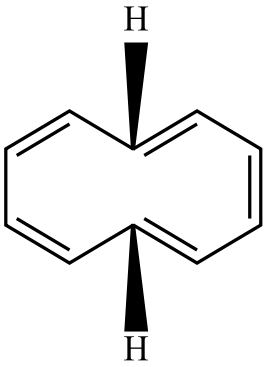
But-2-enal, 2-Methylpent-2-enal, 2-Methylbut-2-enal and Pent-2-enal

(NEW NCERT 12th Part-II Page No. 242)

96. (2)

Due to the repulsion of hydrogen atoms (mentioned below), this compound is non-planar.

Hence, it is not an aromatic compound.



(NEW NCERT 11th Part-I Page No. 261)

97. (4)

$$\log\frac{k_2}{k_1}=\frac{E_a}{2.303\times R}\left[\frac{T_2-T_1}{T_1T_2}\right]$$

$$\log\frac{4\times10^{-4}}{0.4\times10^{-4}}=\frac{E_a}{2.303\times8314}\left[\frac{350-300}{300\times350}\right]$$

$$\log10=\frac{E_a}{2.303\times8.314}\times\frac{50}{300\times350}$$

$$1=\frac{E_a}{2.303\times8.314\times300\times7}$$

$$E_a=2.303\times8.314\times300\times7$$

$$E_a=40208.99\ J\ mol^{-1}$$

$$E_a=40.2\ kJ\ mol^{-1}$$

(NEW NCERT 12th Part-I Page No. 80)

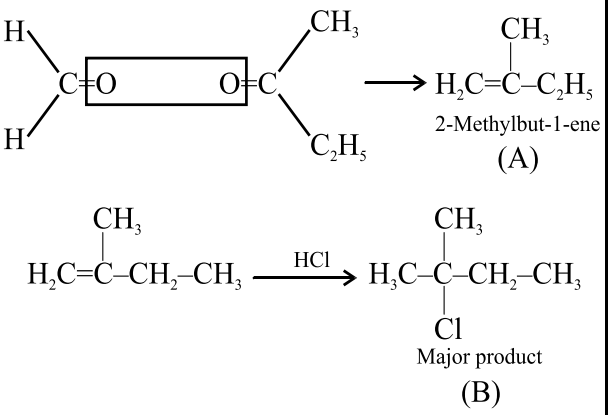
98. (1)

Electron donating groups (+R, +I) decreases the acidity and electron withdrawing groups (–R, –I) increases the acidity of phenol. Since, electron withdrawing tendency of –CN group is maximum, hence it will be most acidic among all substituted phenol.

(NEW NCERT 12th Part-II Page No. 205)

99. (2)

The most probable alkene 'A' will be;



(NEW NCERT 11th Part-II Page No. 310)

100. (4)

$Sc^{3+} = [Ar]3d^0 \rightarrow$ no unpaired electron

$Fe^{2+} = [Ar]3d^6 \rightarrow 4$ unpaired electrons

$Ti^{3+} = [Ar]3d^1 \rightarrow 1$ unpaired electron

$Mn^{2+} = [Ar]3d^5 \rightarrow 5$ unpaired electrons

$Ni^{2+} = [Ar]3d^8 \rightarrow 2$ unpaired electrons

$Cu^{+} = [Ar]3d^{10} \rightarrow$ no unpaired electron

The presence of unpaired electrons in d-subshell, is responsible for colour.

(NEW NCERT 12th Part-I Page No. 103)

(BOTANY)

SECTION-A

101. (1)

The three-domain system has been proposed that divides the Kingdom Monera into two domains, leaving the remaining eukaryotic kingdoms in the third domain and thereby a six kingdom classification.

(NEW NCERT 11th Page No. 11)

102. (2)

A typical angiosperm anther is bilobed with each lobe having two theca, i.e., they are dithecous. The microsporangia develop further and become pollen sacs. When the anther is young, a group of compactly arranged homogenous cells called the sporogenous tissue occupies the centre of each microsporangium.The anther is a four-sided (tetragonal) structure consisting of four microsporangia located at the corners, two in each lobe.

(NEW NCERT 12th Page No. 05)

103. (3)

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangifera*	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae
Wheat	*Triticum aestivum*	*Triticum*	Poaceae	Poales	Monocotyledonae	Angiospermae

(NEW NCERT 11th Page No. 08)

104. (1)

Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence. The stems are unbranched (*Cycas*) or branched (*Pinus, Cedrus*).

(NEW NCERT 11th Page No. 32, 33)

105. (4)

When F_1 generation plants (Rr) are crossed with recessive parent (rr). According to the Punnett square drawn on the given data, no red plants are produced.

	R	r
r	Rr (pink)	rr (white)
r	Rr (pink)	rr (white)

When the F_1 was self-pollinated the F_2 resulted in the ratio 1 (RR) Red: 2 (Rr) Pink: 1 (rr) White. No dominant character is observed in the F_1 generation.

(NEW NCERT 12th Page No. 60)

106. (1)

All tissues on the innerside of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

(NEW NCERT 11th Page No. 74)

107. (4)

Endoplasmic reticulum	Continuous with the outer membrane of the nucleus
Golgi apparatus	Cisternae are concentrically arranged near the nucleus
Lysosomes	Membrane bound vesicular structures
Mitochondria	Inner membrane forms a cristae

(NEW NCERT 11th Page No. 95, 96, 97)

108. (4)

The first action spectrum of photosynthesis was described by T.W Engelmann. It resembles roughly the absorption spectra of chlorophyll *a* and *b*.

(NEW NCERT 11th Page No. 135)

109. (3)

Miller et al. (1955) identified and crystallised the cytokinesis promoting active substance that they termed kinetin.

(NEW NCERT 11th Page No. 175)

110. (4)

Walter Sutton and Theodore Boveri noted that the behaviour of chromosomes was parallel to the behaviour of genes and used chromosome movement to explain Mendel's laws.

(NEW NCERT 12th Page No. 65)

111. (4)

Auxin	Initiate rooting in stem cuttings
Gibberellin	Hastens maturity period in juvenile conifers
Cytokinin	Promote nutrient mobilisation
Ethylene	Hastens fruit ripening in tomatoes and apples

(NEW NCERT 11th Page No. 175, 176, 177)

112. (1)

In the Citric acid cycle, during the conversion of succinyl-CoA to succinic acid a molecule of GTP is synthesised.

(NEW NCERT 11th Page No. 159)

113. (3)

In Numerical Taxonomy each character is given equal importance and at the same time hundreds of characters can be considered. Cytotaxonomy that is based on cytological information like chromosome number, structure, behaviour.

(NEW NCERT 11th Page No. 24)

114. (1)

No enzyme that degrades sporopollenin is so far known. Pollen grain exine has prominent apertures called germ pores where sporopollenin is absent.

(NEW NCERT 12th Page No. 07)

115. (4)

The sex determination in honey bee follows haplodiploid sex-determination system and has special characteristic features such as the males produce sperms by mitosis, they do not have father and thus cannot have sons, but have a grandfather and can have grandsons.

(NEW NCERT 12th Page No. 71)

116. (2)

Histones are organised to form a unit of eight molecules called histone octamer. The negatively charged DNA is wrapped around the positively charged histone octamer to form a structure called nucleosome.

(NEW NCERT 12th Page No. 83)

117. (4)

Bacteria can fix atmospheric nitrogen while free-living in the soil (examples *Azospirillum* and *Azotobacter*), thus enriching the nitrogen content of the soil. *Glomus* is a fungus that forms mycorrhiza. *Rhizobium* can fix atmospheric nitrogen only in symbiotic condition.

(NEW NCERT 12th Page No. 158)

118. (3)

Connell's elegant field experiments showed that on the rocky sea coasts of Scotland, the larger and competitively superior barnacle *Balanus* dominates the intertidal area, and excludes the smaller barnacle *Chathamalus* from that zone. Hence, this type of population interaction is known as competition.

(NEW NCERT 12th Page No. 199)

119. (2)

Complex I	Electrons from NADH are oxidised
Complex II	Oxidation of succinate to fumarate
Complex III	Transfer of electrons to cytochrome *c* via cytochrome bc_1 complex
Complex IV	Complex containing cytochromes *a* and a_3, and two copper centres

(NEW NCERT 11th Page No. 160)

120. (3)

A flower is a modified shoot wherein the shoot apical meristem changes to floral meristem. Internodes do not elongate and the axis gets condensed. The apex produces different kinds of floral appendages laterally at successive nodes instead of leaves. In cymose type of inflorescence the main axis terminates in a flower, hence is limited in growth. The flowers are borne in a basipetal order.

(NEW NCERT 11th Page No. 61)

121. (2)

In the monocotyledons, the vascular bundles have no cambium present in them. Hence, since they do not form secondary tissues they are referred to as closed.

(NEW NCERT 11th Page No. 73)

122. (1)

There is a clear division of labour within the chloroplast. The membrane system is responsible for trapping of light energy and also for the synthesis of ATP and NADPH. In stroma, enzymatic reactions synthesise sugar, which in turn forms starch.

(NEW NCERT 11th Page No. 136)

123. (1)

The RNA polymerase II transcribes precursor of mRNA, the heterogeneous nuclear RNA (hnRNA).

(NEW NCERT 12th Page No. 95)

124. (2)

Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis. Gross primary productivity minus respiration losses (R), is the net primary productivity (NPP). Net primary productivity is the available biomass for the consumption to heterotrophs (herbiviores and decomposers). Secondary productivity is defined as the rate of formation of new organic matter by consumers.

(NEW NCERT 12th Page No. 207)

125. (3)

Species A	Species B	Name of Interaction
+	+	*Mutualism*
–	–	*Competition*
+	–	*Predation*
+	–	*Parasitism*
+	0	*Commensalism*
–	0	*Amensalism*

(NEW NCERT 12th Page No. 197)

126. (1)

The cells of the elongation zone gradually differentiate and mature. Hence, this zone, proximal to region of elongation, is called the region of maturation.

(NEW NCERT 11th Page No. 59)

127. (3)

During anaphase, the chromatids move to opposite poles. During metaphase, chromosomes move to the equator.

(NEW NCERT 11th Page No. 122, 123, 124)

128. (4)

Zoological parks, botanical gardens and wildlife safari parks are part of *ex situ* conservation strategies.

(NEW NCERT 12th Page No. 225)

129. (2)

There are certain limitations of ecological pyramids such as it does not take into account the same species belonging to two or more trophic levels. It assumes a simple food chain, something that almost never exists in nature; it does not accommodate a food web. Moreover, saprophytes are not given any place in ecological pyramids even though they play a vital role in the ecosystem.

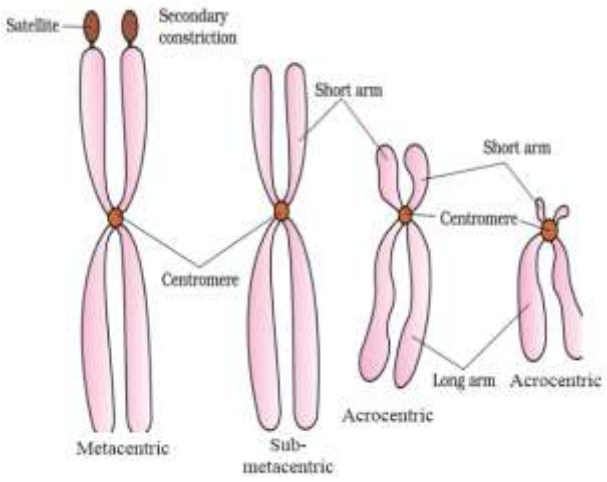
(NEW NCERT 12th Page No. 214)

130. (1)

In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part. Ovary is one-chambered but it becomes two- chambered due to the formation of the false septum, e.g., mustard and *Argemone*.

(NEW NCERT 11th Page No. 65)

131. (4)



(NEW NCERT 11th Page No. 101)

132. (2)

Mitosis or the equational division is usually restricted to the diploid cells only. However, in some lower plants and some social insects haploid cells also divide by mitosis. A very significant contribution of mitosis is cell repair.

(NEW NCERT 11th Page No. 125)

133. (4)

AUG has dual functions. It codes for Methionine (met), and it also act as initiator codon. UUU codes for phenylalanine.

(NEW NCERT 12th Page No. 96)

134. (3)

In cyclic photophosphorylation, the excited electron does not pass on to $NADP^+$ but is cycled back to the PS I complex through the electron transport chain. The cyclic flow hence, results only in the synthesis of ATP, but not of $NADPH + H^+$.

(NEW NCERT 11th Page No. 140)

135. (1)

During pachytene, the four chromatids of each bivalent chromosomes becomes distinct and clearly appears as tetrads. This stage is characterised by the appearance of recombination nodules, the sites at which crossing over occurs between non-sister chromatids of the homologous chromosomes.

(NEW NCERT 11th Page No. 126)

SECTION-B

136. (4)

Deuteromycetes which commonly known as imperfect fungi because only the asexual or vegetative phases of these fungi are known. The mycelium is septate and branched. Some members are saprophytes or parasites while a large number of them are decomposers of litter and help in mineral cycling.

(NEW NCERT 11th Page No. 18)

137. (1)

In mosses, the first stage is the protonema stage, which develops directly from a spore. It is a creeping, green, branched and frequently filamentous stage. The second stage is the leafy stage, which develops from the secondary protonema as a lateral bud. They consist of upright, slender axes bearing spirally arranged leaves. They are attached to the soil through multicellular and branched rhizoids.

(NEW NCERT 11th Page No. 30)

138. (2)

Valvate	*Calotropis*
Twisted	Cotton
Imbricate	*Cassia*
Vexillary	Bean

(NEW NCERT 11th Page No. 64)

139. (4)

In monocot stem, the phloem parenchyma is absent, and water-containing cavities are present within the vascular bundles.

(NEW NCERT 11th Page No. 76)

140. (2)

The centrioles form the basal body of cilia or flagella.

(NEW NCERT 11th Page No. 100)

141. (2)

During S-phase the amount of DNA per cell doubles. If the initial amount of DNA is denoted as 2C then it increases to 4C. However, there is no increase in the chromosome number; if the cell had diploid or 2n number of chromosomes at G_1, even after S phase the number of chromosomes remains the same, i.e., 2n.

(NEW NCERT 11th Page No. 122)

142. (3)

Carboxylation is the fixation of CO_2 into a stable organic intermediate. Carboxylation is the most crucial step of the Calvin cycle where CO_2 is utilised for the carboxylation of RuBP.

(NEW NCERT 11th Page No. 143)

143. (4)

For each ATP produced, $4H^+$ passes through F_0 from the intermembrane space to the matrix down the electrochemical proton gradient.

(NEW NCERT 11th Page No. 161)

144. (2)

Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called plasticity, e.g., heterophylly in cotton, coriander and larkspur. In such plants, the leaves of the juvenile plant are different in shape from those in mature plants. On the other hand, difference in shapes of leaves produced in air and those produced in water in buttercup also represent the heterophyllous development due to environment.

(NEW NCERT 11th Page No. 173)

145. (1)

The cylindrical portion below the level of cotyledons is hypocotyl that terminates at its lower end in the radicle or root tip.

(NEW NCERT 12th Page No. 19)

146. (3)

Thalassemia is an autosome-linked recessive blood disease transmitted from parents to the offspring when both the partners are unaffected carrier for the gene (or heterozygous). Thalassemia is a quantitative problem of synthesising too few globin molecules.

(NEW NCERT 12th Page No. 75)

147. (4)

tRNAs are specific for each amino acid.

(NEW NCERT 12th Page No. 98)

148. (2)

Yeast	Commercial production of ethanol
Lipases	Used in detergent formulations
Pectinases	Bottled juices are clarified
Streptokinase	Removing clots from the blood vessels of patients

(NEW NCERT 12th Page No. 153)

149. (2)

MacArthur showed that five closely related species of warblers living on the same tree were able to avoid competition and co-exist due to behavioural differences in their foraging activities. Gause's 'Competitive Exclusion Principle' states that two closely related species competing for the same resources cannot co-exist indefinitely. In competitive exclusion when resources are limited the competitively superior species will eventually eliminate the other species.

(NEW NCERT 12th Page No. 199)

150. (1)

When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate.

(NEW NCERT 12th Page No. 223)

(ZOOLOGY)

SECTION-A

151. (1)

A cup shaped bone called patella cover the knee ventrally (knee cap). It is a part of appendicular skeleton.

(NEW NCERT 11th Page No. 226)

152. (3)

The glomerular capillary blood pressure causes filtration of blood through 3 layers, i.e., the endothelium of glomerular blood vessels, the epithelium of Bowman's capsule and a basement membrane between these two layers.

(NEW NCERT 11th Page No. 208)

153. (1)

Blood Group	Antigens on RBCs	Antibodies in Plasma	Donor's Group
A	A	anti-B	A, O
B	B	anti-A	B, O
AB	A, B	nil	AB, A, B, O
O	nil	anti-A, B	O

(NEW NCERT 11th Page No. 195)

154. (2)

Introduction of sex education in schools should also be encouraged to provide right information to the young so as to discourage children from believing in myths and having misconceptions about sex-related aspects. Better awareness about sex related matters, increased number of medically assisted deliveries and better post-natal care leading to decreased maternal and infant mortality rates, increased number of couples with small families, better detection and cure of STDs and overall increased medical facilities for all sex related problems, etc. all indicate improved reproductive health of the society.

(NEW NCERT 12th Page No. 43, 44)

155. (4)

Pre-historic cave art developed about 18,000 years ago. One such cave paintings by Pre-historic humans can be seen at Bhimbetka rock shelter in Raisen district of Madhya Pradesh.

(NEW NCERT 12th Page No. 125)

156. (2)

FSH acts on the Sertoli cells and stimulates secretion of some factors which help in the process of spermiogenesis.

(NEW NCERT 12th Page No. 31)

157. (1)

Respiration in Aves is by lungs. Air sacs connected to lungs supplement respiration. Examples : *Corvus* (Crow), *Columba* (Pigeon), *Psittacula* (Parrot), *Struthio* (Ostrich), *Pavo* (Peacock), *Aptenodytes* (Penguin), *Neophron* (Vulture). *Pristis* is cartilaginous fish. *Betta* is aquarium fish. *Rana* is an amphibian.

(NEW NCERT 11th Page No. 47, 50)

158. (2)

The fatty acids are found esterified with glycerol. They can be then monoglycerides, diglycerides and triglycerides. These are also called fats and oils based on melting point. Oils have lower melting point (e.g., gingelly oil) and hence remain as oil in winters.

(NEW NCERT 11th Page No. 106)

159. (4)

Palindromes are groups of letters that form the same words when read both forward and backward, MALAYALAM similarly palindromic nucleotide sequence are 5'-CTGCAG-3' and 3'-GACGTC-5'.

(NEW NCERT 12th Page No. 166)

160. (1)

PCT is lined by simple cuboidal brush border epithelium which increases the surface area for reabsorption. Nearly all of the essential nutrients, and 70-80 per cent of electrolytes and water are reabsorbed by this segment.

(NEW NCERT 11th Page No. 209)

161. (2)

Fertilisation and further development w.r.t. *Plasmodium* occurs in mosquito gut. Sexual phase of *Plasmodium's* life cycle completes in mosquito's body therefore, mosquito is the primary host for *Plasmodium*.

(NEW NCERT 12th Page No. 132)

162. (1)

Each fallopian tube is about 10-12 cm long and extends from the periphery of each ovary to the uterus, the part closer to the ovary is the funnel-shaped infundibulum. The edges of the infundibulum possess finger-like projections called fimbriae, which help in collection of the ovum after ovulation. The infundibulum leads to a wider part of the oviduct called ampulla. The last part of the oviduct, isthmus has a narrow lumen and it joins the uterus.

(NEW NCERT 12th Page No. 29)

163. (2)

Abiotic stresses are non-living, these include heat, cold, drought, salt etc. Biotic stresses are living, these are bacteria, fungus, bacteria etc.

(NEW NCERT 12th Page No. 179)

164. (4)

Adenine, Thymine, Guanine and Cytosine are present in DNA. Adenine, Uracil, Guanine and Cytosine are present in RNA. GLUT-4, which enables glucose transport into cells, is a protein.

(NEW NCERT 11th Page No. 109, 111)

165. (2)

Limulus or King crab is a living fossil. Living fossil is an animal or plant that has remained almost unchanged from earlier geologic times and whose close relatives are usually all extinct.

(NEW NCERT 11th Page No. 44)

166. (4)

Chordae tendineae is present in the ventricles of heart. It prevents the valves of heart from movement by holding the flaps tightly against the strong flow of blood.

(**NEW NCERT 11th Page No. 198)**

167. (2)

Co-enzymes are organic compounds but their association with the apoenzyme is only transient, usually occurring during the course of catalysis. The essential chemical components of many coenzymes are vitamins, e.g., coenzyme nicotinamide adenine dinucleotide (NAD) and NADP contain the vitamin niacin.

(NEW NCERT 11th Page No. 118)

168. (3)

It is possible that the work of Thomas Malthus on populations influenced Darwin. According to Malthus, population growth would always overpower food supply growth, creating perpetual states of hunger, disease and struggle. Darwin extended this principle of struggle to the evolutionary scheme.

(**NEW NCERT 12th Page No. 119)**

169. (1)

IUDs increase phagocytosis of sperms within the uterus and the Cu ions released suppress sperm motility and the fertilising capacity of sperms. The hormone releasing IUDs, in addition, make the uterus unsuitable for implantation and the cervix hostile to the sperms. IUDs are ideal contraceptives for the females who want to delay pregnancy and/or space children. It is one of most widely accepted methods of contraception in India.

(**NEW NCERT 12th Page No. 44, 45)**

170. (2)

Crocodilus belongs to class Reptilia. They have four chambered heart and are poikilothermous. They have epidermal scales. *Macaca*(monkey) belongs to class Mammalia. They have four chambered heart and are homoiothermous. In both notochord is replaced by vertebral column in adult stage.

(**NEW NCERT 11th Page No. 48, 50, 51)**

171. (1)

Frogs are not seen during peak summer and winter. During this period they take shelter in deep burrows to protect them from extreme heat and cold. This is known as summer sleep (aestivation) and winter sleep (hibernation) respectively.

(NEW NCERT 11th Page No. 80)

172. (3)

Lymphoid organs are the organs where origin and/or maturation and proliferation of lymphocytes occur. The primary lymphoid organs are bone marrow and thymus where immature lymphocytes differentiate into antigen-sensitive lymphocytes. After maturation the lymphocytes migrate to secondary lymphoid organs like spleen, lymph nodes, tonsils, Peyer's patches of small intestine and appendix. The secondary lymphoid organs provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become effector cells.

(**NEW NCERT 12th Page No. 137, 138)**

173. (4)

Fibrins are formed by the conversion of inactive fibrinogens in the plasma by the enzyme thrombin. Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase, is required for the above reaction.

(NEW NCERT 11th Page No. 196)

174. (1)

Total Lung Capacity (TLC) is the total volume of air accommodated in the lungs at the end of a forced inspiration. This includes RV, ERV, TV and IRV or vital capacity + residual volume.

(NEW NCERT 11th Page No. 187)

175. (1)

Frequency of recessive allele a is 0.4

Frequency of dominant recessive A is 0.6, as Sum total of all the allelic frequencies is 1.

according to hardyweinberg equilibrium,

$(p + q)^2 = 1$ i.e., $p^2 + 2pq + q^2 = 1$

The frequency of homozygous dominant (AA)

$= p^2 = 0.6 \text{ X } 0.6 = 0.36$

The frequency of heterozygous (Aa)

$= 2pq = 2 \times 0.6 \times 0.4 = 0.48$

The frequency of homozygous recessive (aa)

$= q^2 = 0.4 \times 0.4 = 0.16$

(NEW NCERT 12th Page No. 120, 121)

176. (4)

The tumor inducing (Ti) plasmid of *Agrobacterium tumifaciens* has now been modified into a cloning vector which is no more pathogenic to the plants but is still able to use the mechanisms to deliver genes of our interest into a variety of plants. It is indirect method of gene transfer.

(NEW NCERT 12th Page No. 170)

177. (3)

Thyroid hormones play an important role in the regulation of the basal metabolic rate. These hormones also support the process of red blood cell formation. Thyroid hormones control the metabolism of carbohydrates, proteins and fats. Maintenance of water and electrolyte balance is also influenced by thyroid hormones. Thyroid gland also secretes a protein hormone called thyrocalcitonin (TCT) which regulates the blood calcium levels.

(NEW NCERT 11th Page No. 243)

178. (3)

In males cockroach, genital pouch or chamber lies at the hind end of abdomen bounded dorsally by 9th and 10th terga and ventrally by the 9th sternum.

(Old NCERT 11th Page No. 112)

179. (1)

Heart is a mesodermally derived organ. It is protected by a double walled membranous bag, pericardium, enclosing the pericardial fluid. Pulmonary artery is provided with semilunar valve to prevent backflow of blood. The SAN can generate the maximum number of action potentials, i.e., 70-75 min^{-1}, and is responsible for initiating and maintaining the rhythmic contractile activity of the heart. Therefore, it is called the pacemaker.

(NEW NCERT 11th Page No. 194, 199, 203)

180. (3)

The signals for parturition originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex. This triggers release of oxytocin from the maternal pituitary. Prolactin helps in development of mammary gland and production of milk, it does not initiate parturition.

(NEW NCERT 12th Page No. 38)

181. (3)

Selection of recombinants in pBR322 is due to inactivation of antibiotics is a cumbersome procedure because it requires simultaneous plating on two plates having different antibiotics.

(NEW NCERT 12th Page No. 170)

182. (4)

In a resting state, the edges of thin filaments on either side of the thick filaments partially overlap the free ends of the thick filaments leaving the central part of the thick filaments. This central part of thick filament, not overlapped by thin filaments is called the 'H' zone.

(NEW NCERT 11th Page No. 220)

183. (1)

Cytokine barriers : Virus-infected cells secrete proteins called interferons which protect non-infected cells from further viral infection.

(NEW NCERT 12th Page No. 135)

184. (2)

Human zygotę is a single celled structure which is diploid in nature. It carries either XX or XY sex chromosome depending on the type of sex chromosome of father fuses during fertilisation. It carries zona pellucida layer that induces changes in the membrane and block the entry of additional sperms.

(NEW NCERT 12th Page No. 35)

185. (3)

The midbrain is located between the thalamus/hypothalamus of the forebrain and pons of the hindbrain. A canal called the cerebral aqueduct passess through the midbrain.

(NEW NCERT 11th Page No. 236)

SECTION-B

186. (2)

Recombinant DNA technology has allowed the production of antigenic polypeptides of pathogen in bacteria or yeast. Vaccines produced using this approach allow large scale production and hence greater availability for immunisation, e.g., hepatitis B vaccine produced from yeast.

(NEW NCERT 12th Page No. 136)

187. (3)

In frog, food is captured by the bilobed tongue. Digestion of food takes place by the action of HCl and gastric juices secreted from the walls of the stomach. Partially digested food called chyme is passed from stomach to the first part of the small intestine, the duodenum.

(NEW NCERT 11th Page No. 82)

188. (1)

List-I	List-II
Culex	Belongs to largest phylum
Antedon	Marine spiny bodied animal
Saccoglossus	Presence of proboscis gland
Myxine	Devoid of paired fins

(NEW NCERT 11th Page No. 44, 45, 47)

189. (3)

The world population was around 2 billion (2000 million) in 1900. Population of India was approximately 350 million at the time of independence. According to the 2011 census report, the population growth rate was less than 2 per cent, i.e., 20/1000/year. A rapid decline in death rate, maternal mortality rate (MMR) and infant mortality rate (IMR) as well as an increase in number of people in reproducible age are probable reasons for population explosion.

(NEW NCERT 12th Page No. 43)

190. (2)

The sequence of amino acids i.e., the positional information in a protein – which is the first amino acid, which is second, and so on – is called the primary structure of a protein. A protein thread does not exist throughout as an extended rigid rod. The thread is folded in the form of a helix (similar to a revolving staircase).

(NEW NCERT 11th Page No. 111, 112)

191. (3)

During menstrual phase, endometrium breaks and its blood vessels which forms liquid that comes out through vagina.

The ovulation (ovulatory phase) is followed by the luteal phase during which the remaining parts of the Graafian follicle transform as the corpus luteum. The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the endometrium.

(**NEW NCERT 12th Page No. 35)**

192. (3)

Melatonin plays a very important role in the regulation of a 24-hour (diurnal) rhythm of our body. For example, it helps in maintaining the normal rhythms of sleep-wake cycle, body temperature. It also influences metabolism, pigmentation, menstrual cycle as well as our defense capability.

(NEW NCERT 11th Page No. 242)

193. (3)

Cardiac muscles can be differentiated from skeletal muscles on the basis of presence of communication junctions, uninucleate and branching. Striation is present in both skeletal and cardiac muscles.

(NEW NCERT 11th Page No. 218, 219)

194. (3)

Birds are phylogenetically more closer to reptiles than to mammals. Ancestors of both i.e., Thecodonts are same but ancestors of mammals are not much closer to birds.

(NEW NCERT 12th Page No. 123)

195. (2)

List-I	List-II
Chilled ethanol	Precipitation of purified DNA
Ethidium bromide	Visualisation of DNA fragments
Protease	Digests histones
Ribonuclease	Digests RNA

(NEW NCERT 12th Page No. 168, 171)

196. (4)

In certain industries, especially those involving grinding or stone-breaking, so much dust is produced that the defense mechanism of the body cannot fully cope with the situation. Long exposure can give rise to inflammation leading to fibrosis (proliferation of fibrous tissues) and thus causing serious lung damage.

(NEW NCERT 11th Page No. 191)

197. (2)

'A' is carbonic anhydrase enzyme. RBCs contain a very high concentration of this enzyme and minute quantities of the same is present in the plasma too. By using this enzyme present within the cytoplasm, the reaction speeds dramatically with about 600,000 molecules being formed every second. The enzyme has accelerated the reaction rate by about 10 million times.

(NEW NCERT 11th Page No. 114, 190)

198. (3)

A fall in GFR can activate the JG cells to release renin which can stimulate the glomerular blood flow and thereby the GFR back to normal. Rennin is a digestive enzyme.

(NEW NCERT 11th Page No. 209)

199. (4)

Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's.

(NEW NCERT 12th Page No. 183)

200. (1)

The terminal ends of axon are in contact with dendrites of four adjacent neurons, the nerve impulse of the axon will travels in all the four neurons and doesn't results in weak impulse.

(NEW NCERT 11th Page No. 233, 234)

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